Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (**currently amended**) A connection switching device for implementing Optical Channel Shared Protection Ring (Och-SPRing), used in a node of an optical network system with a working path and a backup path, comprising:

a first **switch** and a second switch, each of the first switch and the second switch has two unidirectional input ports and one unidirectional output port, and one of the input ports of the first switch is connected to the output port of the first switch under the control of the first switch, one of the input ports of the second switch is connected to the output port of the second switch under control of the second switch;

wherein one input port of the first switch connects to and receives downlink service signals from a downlink direction of the working path, the other input port of the first switch connects to and receives the downlink service signals from a downlink direction of the backup path, and the output port of the first switch connects and outputs the downlink service signals to a local drop path;

one input port of the second switch connects to and receives uplink service signals from a local add path, the other input port of the second switch connects to and receives the downlink service signals from the downlink direction of the backup path and the output port of the second switch connects to an uplink direction of the backup path; and

the local add path is connected with an uplink direction of the working path at the same time.

2. (Previously presented) The connection switching device according to claim 1, wherein under normal modes of the connection switching device, the input port, which connects to the downlink direction of the working path, of the first switch, is connected to the output port of the first switch;

under local drop modes, the input port, which connects to the downlink direction of the backup path, of the first switch, is connected to the output port of the first switch;

under local add modes, the input port, which connects to the local add path, of the second switch, is connected to the output port of the second switch; and

under express modes, the input port, which connects to the downlink direction of the backup path, of the second switch, is connected to the output port of the second switch.

3. (Previously presented) The connection switching device according to claim 1, wherein the first switch and the second switch of the device can be one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

4. (Previously presented) The connection switching device according to claim 2, wherein the first switch and the second switch of the device can be one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

5. (Previously presented) A connection switching device for implementing Optical Channel Shared Protection Ring (Och-SPRing), applied in unidirectional service drop function of a node in an optical network system with a working path and a backup path, comprising:

a first switch, which has two unidirectional input ports and one unidirectional output port, and one of the input ports of the first switch is connected to the output port

of the first switch under control of the first switch; one input port of the first switch connects to and receives downlink service signals from a downlink direction of the working path, the other input port of the first switch connects to and receives the downlink service signals from a downlink direction of the backup path, and the output port of the first switch connects and outputs the downlink services signals to a local drop path; and

a second switch, which has one unidirectional input port and one unidirectional output port, and the input port of the second switch is open or close to the output port under the control of the second switch; the input port of the second switch connects to and receives the downlink service signals from the downlink direction of the backup path, the output port of the second switch connects and outputs the downlink service signals to an uplink direction of the backup path.

6. **(currently amended)** The connection switching device according to claim 5, wherein under normal modes of the connection switching device, the input port, which connects to the downlink direction of the working path, of the first switch, is connected to the output port of the first switch;

under **local ~~the local~~** add modes, the input port, which connects to the downlink direction of the backup path, of the first switch, is connected to the output port of the first switch; and

under express modes, the input port of the second switch, is connected to the output port of the second switch.

7. (Previously presented) The connection switching device according to claim 5, wherein the first switch and the second switch of the connection switching device can be one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

8. (Previously presented) The connection switching device according to claim 6, wherein the first switch and the second switch of the connection switching device can be one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

9. (**currently amended**) A connection switching device for implementing Optical Channel Shared Protection Ring (Och-SPRing), applied in unidirectional service add function of a node in an optical network system with **a working** ~~**the working**~~ path and a backup path, comprising:

a switch, which has two unidirectional input ports and one unidirectional output port, and one of the input ports is connected to the output port under the control of the switch; one input port of the switch connects to and receives uplink service signals from a local add path, the other input port of the switch connects to and receives downlink service signals from a downlink direction of the backup path, and the output port of the switch connects and outputs the downlink service signals or the uplink service signals to an uplink direction of the backup path, and

the local add path is connected to an uplink direction of the working path at the same time.

10. (Previously presented) The connection switching device according to claim 9, wherein:

under local add modes, the input port, which connects to the local add path, of the switch, is connected to the output port of the switch; and

under express modes, the input port, which connects to the downlink direction of the backup path, of the switch, is connected to the output port of the switch.

11. (Previously presented) The connection switching device according to claim 9, wherein: the switch is any one of an optical switch, an electric switch, and a logical switch.

12. (Previously presented) The connection switching device according to claim 10, wherein the switch is any one of an optical switch, an electric switch, and a logical switch.

13. (Previously presented) An optical network system for implementing Optical Channel Shared Protection Ring (Och-SPRing), comprising a bi-directional working path and a bi-directional backup path, wherein:

a bi-directional service transmission-reception node in the system comprises two identical connection switching devices, respectively connect with the working path and the backup path in one direction, and each of the connection switching devices comprises: a first switch and a second switch, each of the first switch and the second switch has two unidirectional input ports and one unidirectional output port, and one of the input ports of the first switch is connected to the output port of the first switch under the control of the first switch, one of the input ports of the second switch is connected to the output port of the second switch under control of the second switch; one input port of the first switch connects to and receives downlink service signals from a downlink direction of the working path, the other input port of the first switch connects to and receives the downlink service signals from a downlink direction of the backup path, and the output port of the first switch connects and outputs the downlink service signals to a local drop path; one input port of the second switch connects to and receives uplink service signals from a local add path, the other input port of the second switch connects to and receives the downlink service signals from the downlink direction of the backup path and the output port of the second switch connects and outputs the uplink service signals or the downlink service signals to an uplink direction of the backup path; the local add path is connected with an uplink direction of the working path at the same time;

an unidirectional service transmission-reception node in the system comprises one connection switching device used for unidirectional service drop, and one connection switching device used for unidirectional service add;

the connection switching device used for unidirectional service drop comprises: a first switch, which has two unidirectional input ports and one unidirectional output port, and one of the input ports is connected to the output port under the control of the first switch; one input port of the first switch connects to and receives downlink service signals from the downlink direction of the working path, the other input port of the first switch connects to and receives the downlink service signals from the downlink direction of the backup path, and the output port of the first switch connects and output the downlink service signals to the local drop path; a second switch, which has one unidirectional input port and one unidirectional output port, and the input port of the second switch is open or close to the output port of the second switch under the control of the second switch; the input port of the second switch connects to and receives the downlink service signals from the downlink direction of the backup path, the output port of the second switch connects and outputs the downlink service signals to the uplink direction of the backup path; and

the connection switching device used for unidirectional service add comprises: one switch, which has two unidirectional input ports and one unidirectional output port, and one of the input ports is connected to the output port under the control of the switch; one input port of the switch connects to and receives the uplink service signals from the local add path, the other input port connects to and receives the downlink service signals from the downlink direction of the backup path, and the output port connects and outputs the uplink service signals or the downlink service signals to the uplink direction of the backup path; the local add path is connected to the uplink direction of the working path at the same time.

14. (Previously presented) The optical network system according to claim 13, wherein as to the connection switching device in the bi-directional service transmission-reception node in the system, under normal modes, the input port, which connects to

the downlink direction of the working path, of the first switch, is connected to the output port of the first switch; under local drop modes, the input port, which connects to the downlink direction of the backup path, of the first switch, is connected to the output port of the first switch; under local add modes, the input port, which connects to the local add path, of the second switch, is connected to the output port of the second switch; under express modes, the input port, which connects to the downlink direction of the backup path, of the second switch, is connected to the output port of the second switch;

as to the connection switching device applied in unidirectional service drop in the unidirectional service transmission-reception node in the system, under the normal modes, the input port, which connects to the downlink direction of the working path, of the first switch, is connected to the output port of the first switch; under the local add modes, the input port, which connects to the downlink direction of the backup path, of the first switch, is connected to the output port of the first switch; under the express modes, the input port of the second switch, is connected to the output port of the second switch; and

as to the connection switching device applied in unidirectional service add in an unidirectional service transmission-reception node in the system, under the local add modes, the input port, which connects to the local add path, of the switch, is connected to the output port of the switch; under the express modes, the input port, which connects to the downlink direction of the backup path, of the switch, is connected to the output port of the switch.

15. (Previously presented) The optical network system according to claim 13, wherein the node of the system further comprises: a first Optical Add Drop Multiplexing (OADM) unit, an input port of the first OADM unit connects with a transmission optical fiber in the optical network system, and is used for dividing optical signals input through the optical fiber according to their wavelengths, and then transmitting the signals to the working path and the backup path; and

a second OADM unit, an output port of the second OADM unit connects with the transmission optical fiber in the optical network system, and is used for combining

optical signals of different wavelengths output through the working path and the backup path, and then transmitting the signals to the transmission optical fiber.

16. (Previously presented) The optical network system according to claim 15, wherein the two OADM units, which connect the same optical fiber in the system, are further directly connected with each other through a transmission path, which is used for express processing on the optical signals which have no interactions with the node.

17. (Previously presented) The optical network system according to claim 13, wherein the first switch and the second switch of the connection switching device is one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

18. (Previously presented) The optical network system according to claim 14, wherein the first switch and the second switch of the connection switching device is one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

19. (Previously presented) The optical network system according to claim 15, wherein the first switch and the second switch of the connection switch device is one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch

is an optical switch.

20. (Previously presented) The optical network system according to claim 16, wherein the first switch and the second switch of the connection switching device is one of the three available combinations:

both of the first and the second switches are optical switches; and, the first switch is an electric switch in an Optical Transformation Unit (OTU), and the second switch is an optical switch; and, the first switch is a logical switch, and the second switch is an optical switch.

21. (Previously presented) A method for implementing Optical Channel Shared Protection Ring (Och-SPRing), applied to an optical network system with a working path and a backup path, comprising:

controlling a first switch to receive downlink service signals from the working path or the backup path when receiving the signals, wherein the first switch has two unidirectional input ports and one unidirectional output port, one input port of the first switch connects to and receives the downlink service signals from a downlink direction of the working path, the other input port of the first switch connects to and receives the downlink service signals from a downlink direction of the backup path, and the output port of the first switch connects and outputs the downlink service signals to a local drop path;

transmitting uplink service signals received from a local device respectively to an uplink direction of the working path and one of two input ports of a second switch when transmitting the signals, wherein the second switch has two unidirectional input ports and one unidirectional output port, one input port of the second switch connects to and receives the uplink service signals from a local add path, the other input port of the second switch connects to and receives the downlink service signals from the downlink direction of the backup path and the output port of the second switch connects to the uplink direction of the backup path; the local add path is connected with the uplink direction of the working path at the same time; and

controlling the second switch to choose the uplink service signals or the downlink service signals, and output the selected signals to an uplink direction of the backup path.

22. (Previously presented) The method according to claim 21, wherein under normal modes, the input port, which connects to the downlink direction of the working path, is connected to the output port of the first switch, under the control of the first switch; the signals from the downlink direction of the backup path are input to the local drop path through the first switch; the signals from the local add path are directly input to the uplink direction of the working path;

if the node needs to enter local drop modes, the input port, which connects to the downlink direction of the backup path, is connected to the output port of the first switch, under the control of the first switch; the signals from the downlink direction of the backup path are input to the local drop path through the first switch;

if the node needs to enter local add modes, the input port, which connects to the local add path, is connected to the output port of the second switch, under the control of the second switch; the signals from the local add path are input to the uplink direction of the backup path through the second switch;

if the node needs to enter express modes, the input port, which connects to the downlink direction of the backup path, is connected to the output port of the second switch, under the control of the second switch; the signals from the uplink direction of the backup path are input to the downlink direction of the backup path through the second switch.

23. (Original) The method according to claim 22, further comprising: controlling the second switch to open the input port, which connects to the local add path, to the output port under the normal working modes.